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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/680,038	10/07/2003	Eugene P. Marsh	150.01160102	8583

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EXAMINER	
WILSON, CHRISTIAN D	

ART UNIT	PAPER NUMBER
2824	

DATE MAILED: 09/27/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

PTO-90C (Rev. 10/03)

Office Action Summary	**Application No.** 10/680,038	**Applicant(s)** MARSH, EUGENE P.	
	Examiner Christian Wilson	**Art Unit** 2824	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *28 June 2004*.
2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-10 and 25-47* is/are pending in the application.
4a) Of the above claim(s) *38-47* is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) *1-10 and 25-37* is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on *07 October 2003* is/are: a)☒ accepted or b)☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
a)☐ All b)☐ Some * c)☐ None of:
1.☐ Certified copies of the priority documents have been received.
2.☐ Certified copies of the priority documents have been received in Application No. _____.
3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Election/Restrictions

1. Claims 38 – 47 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Information Disclosure Statement

2. The information disclosure statement filed January 13, 2004 fails to comply with the provisions of 37 CFR 1.97, 1.98 and MPEP § 609 because the last other document reference has no date or publication information. It has been placed in the application file, but the information referred to therein has not been considered as to the merits. Applicant is advised that the date of any re-submission of any item of information contained in this information disclosure statement or the submission of any missing element(s) will be the date of submission for purposes of determining compliance with the requirements based on the time of filing the statement, including all certification requirements for statements under 37 CFR 1.97(e). See MPEP § 609 ¶ C(1).

Claim Rejections - 35 USC § 102

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

> A person shall be entitled to a patent unless –
>
> (e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an

> international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

4. Claims 1 – 4, 7, and 8 are rejected under 35 U.S.C. 102(e) as being anticipated by Senzaki *et al.*

Regarding claim 1, Senzaki *et al.* (US 6,503,561) discloses a method of manufacturing a semiconductor structure comprising providing a semiconductor substrate assembly [column 1, lines 15-22], providing a precursor composition comprising a zirconium complex [column 4, line 28], providing a precursor composition comprising a platinum complex [column 4, line 32], and forming a platinum-zirconium containing film **3** from the precursor compositions on the surface of the substrate assembly [column 3, lines 1-15].

Regarding claim 2, Senzaki *et al.* further discloses vaporizing the precursor compositions and directing them toward the substrate assembly using a chemical vapor deposition (CVD) technique [column 5, line 37].

Regarding claim 3, Senzaki *et al.* further discloses a CVD technique comprising bubbling [column 5, line 25].

Regarding claim 4, Senzaki *et al.* further discloses a silicon wafer semiconductor substrate [column 8, line 52].

Regarding claim 7, Senzaki *et al.* discloses a method of forming a film on a substrate comprising providing a substrate [column 1, lines 15-22], providing a precursor composition comprising a zirconium complex [column 4, line 28], providing a precursor composition comprising a platinum complex [column 4, line 32], vaporizing the precursor compositions and directing them toward the substrate assembly [column 5, line 37] to form a platinum-zirconium containing film **3** from the precursor compositions on the surface of the substrate [column 3, lines 1-15].

Regarding claim 8, Senzaki *et al.* further discloses a chemical vapor deposition (CVD) technique [column 5, line 37].

5. Claim 25 is rejected under 35 U.S.C. 102(e) as being anticipated by Toyoda *et al.* Toyoda *et al.* (US 6,001,461) discloses a method of making a capacitor [Figure 16] comprising the steps of forming a first conductive layer **3**, forming a dielectric layer **34** on a portion of the conductive layer, forming a second conductive film **35** where the first conductive layer is a platinum-zirconium film [column 21, line 52].

Claim Rejections - 35 USC § 103

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

7. Claims 5 and 9 are rejected under 35 U.S.C. 103(a) as being unpatentable over Senzaki *et al.* in view of Kirlin *et al.*

Senzaki *et al.* teaches platinum precursor complexes which are similar to the claimed complexes. Kirlin *et al.* (US 5,840,897) teaches a platinum complex which consists of a methyl group and a cyclopentadienyl [column 3, line 50; column 4, line 17]. It would have been obvious to one of ordinary skill in the art to use the platinum complex of Kirlin *et al.* in the method of Senzaki *et al.* since Kirlin *et al.* teaches that this complex is used to optimize volatility, stability, and film purity [column 14, lines 60-62].

8. Claims 6 and 10 are rejected under 35 U.S.C. 103(a) as being unpatentable over Senzaki *et al.* in view of Desu *et al.*

Senzaki *et al.* teaches zirconium precursor complexes which are similar to the claimed complexes. Desu *et al.* (US 5,431,958) teaches a zirconium precursor complex which consists of $Zr(acac)_4$ [column 5, line 47]. It would have been obvious to one of ordinary skill in the art to use the zirconium complex of Desu *et al.* in the method of Senzaki *et al.* since Desu *et al.* teaches that this complex is thermally stable over its vaporization range and is very easy to handle [column 5, lines 57-60].

9. Claims 26 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda *et al.* in view of Miedema *et al.*

Toyoda *et al.* teaches a platinum-zirconium film with a composition of $Pt_{21}Zr_{79}$ [column 14, line 7]. Miedema *et al.* (US 5,104,848) teaches a platinum-zirconium film with a composition range of platinum of 0.3 – 0.6 [column 3, Table 1]. It would have been obvious to one of ordinary skill in the art to use the composition of Miedema *et al.* in the method of Toyoda *et al.* since Miedema *et al.* teaches that this composition does not react with aluminum at the stated temperature and provides an effective diffusion barrier [column 2, lines 8-22].

10. Claim 27 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda *et al.* and Miedema *et al.* as applied to claim 26 above, and further in view of Senzaki *et al.*

Toyoda *et al.* as modified by Miedema *et al.* teaches a sputter deposition method. Senzaki *et al.* teaches a CVD deposition method [column 5, line 37]. It would have been obvious to one of ordinary skill in the art to use the CVD method of Senzaki *et al.* in the method of Toyoda *et al.* since the CVD method provides uniform and conformal deposition [column 1, lines 58-60].

11. Claims 28 and 29 are rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda *et al.*, Senzaki *et al.*, and Miedema *et al.* as applied to claim 27 above, and further in view of Kirlin *et al.*

Toyoda *et al.* as modified by Senzaki *et al.* and Miedema *et al.* teaches platinum precursor complexes which are similar to the claimed complexes. Kirlin *et al.* teaches a platinum complex which consists of a methyl group and a cyclopentadienyl [column 3, line 50; column 4, line 17]. It would have been obvious to one of ordinary skill in the art to use the platinum complex of Kirlin *et al.* in the method of Toyoda *et al.* since Kirlin *et al.* teaches that this complex is used to optimize volatility, stability, and film purity [column 14, lines 60-62].

12. Claim 30 is rejected under 35 U.S.C. 103(a) as being unpatentable over Toyoda *et al.*, Senzaki *et al.*, and Miedema *et al.* as applied to claim 27 above, and further in view of Desu *et al.*

Toyoda *et al.* as modified by Senzaki *et al.* and Miedema *et al.* teaches zirconium precursor complexes which are similar to the claimed complexes. Desu *et al.* teaches a zirconium precursor complex which consists of $Zr(acac)_4$ [column 5, line 47]. It would have been obvious to one of ordinary skill in the art to use the zirconium complex of Desu *et al.* in the method of Toyoda *et al.* since Desu *et al.* teaches that this complex is thermally stable over its vaporization range and is very easy to handle [column 5, lines 57-60].

13. Claims 32 – 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee *et al.* in view of Senzaki *et al.*

Lee *et al.* (US 6,509,601) teaches a method of fabricating a capacitor comprising the steps of providing a substrate **300**, forming an insulative layer **318** overlying the substrate, forming an opening **322** in the insulative layer, forming a conductive plug **330** in the opening which forms a first portion of the first electrode of the capacitor and recessed below the surface of the insulative layer, forming a first conductive layer **332** in the opening and overlying the conductive plug which forms the second portion of the first electrode, and forming a second conductive layer **326** overlying the first conductive layer which forms the third portion of the first electrode. Lee *et al.* teaches a first conductive layer comprising platinum [column 15, line 38] but does not teach a platinum-zirconium film. Senzaki *et al.* teaches a conductive layer in a memory device comprising a platinum-zirconium film [column 1, lines 18-22]. It would have been obvious to one of ordinary skill in the art to use the Pt/Zr film of Senzaki *et al.* in the method of Lee *et al.* since this film provides unique physical properties such as good diffusion barrier properties [column 5, lines 8-15].

Regarding claim 33, Lee *et al.* further discloses creating a dielectric layer **338** on the conductive layer which prevents oxidation of the dielectric layer [column 16, line 55], and creating a second electrode **340** overlying the dielectric layer.

14. Claims 34 – 37 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee *et al.* and Senzaki *et al.* as applied to claim 33 above, and further in view of Tani *et al.*

Regarding claim 34, Lee *et al.* as modified by Senzaki *et al.* teaches the limitations of claim 33 as described above, but does not discuss sputtering the second electrode material. Tani *et al.* (US 6,600,185) teaches a capacitor with a sputtered second electrode [column 5, lines 37-42]. It would have been obvious to one of ordinary skill in the art to form the second electrode material by the sputtering method of Tani *et al.* since Lee *et al.* teaches that sputtering is one of several alternate methods for forming similar materials [column 7, lines 24-55].

Regarding claim 35, Senzaki *et al.* further teaches admitting a precursor composition comprising a platinum complex [column 4, line 32] to a CVD deposition chamber [column 6, line 36], admitting a precursor composition comprising a zirconium complex [column 4, line 28], and applying sufficient reaction gas to the CVD deposition reaction to co-deposit a platinum-zirconium film [column 3, lines 1-15]. It would have been obvious to one of ordinary skill in the art to use the deposition method of Senzaki *et al.* in the method of Lee *et al.* since this method provides uniform and conformal deposition [column 1, lines 58-60].

Regarding claim 36, Tani *et al.* further teaches the planarization of the insulative layer before forming the conductive plug [Figure 17]. It would have been obvious to one of ordinary skill in the art to use the planarization method of Tani *et al.* in the method of Lee *et al.* since this method removes excess material before forming the body of the capacitor [column 8, lines 34-37].

Regarding claim 37, Lee *et al.* further teaches an in-situ doped polysilicon plug [column 15, line 38].

Response to Arguments

15. Applicant's arguments filed June 28, 2004 have been fully considered but they are not persuasive.

Regarding the information disclosure statement, the applicant alleges that the document "Precious Metal Labware Catalog from Alfa Aesar, 6 pgs" must be considered in the present application since it was considered in a parent application. It is noted that 37 CFR 1.98(d)(2) states that to be considered, "The information disclosure statement submitted in the earlier application complies with paragraphs (a) through (c) of this section." In this instance, the IDS fails to comply with paragraph (b)(5) which states that, "Each publication listed in an information disclosure statement must be identified by publisher, author (if any), title, relevant pages of the publication, date, and place of publication." No author, date, or place of publication is listed for "Precious Metal Labware Catalog".

Regarding claims 1 – 4, 7, and 8, applicant alleges that Senzaki *et al.* fails to disclose a zirconium complex and a platinum complex specifically to form a platinum-zirconium film from the precursor components. It is noted that a reference that clearly names the claimed species anticipates the claim no matter how many other species are named (*Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990)). In this instance, Senzaki *et al.* discloses the selection of two metal-ligand complex precursors and then specifically lists both zirconium and platinum [column 4, lines 20-32].

Regarding claim 25, applicant alleges that Toyoda *et al.* fails to disclose the limitations of fabricating a capacitor. Toyoda *et al.* explicitly states that the disclosed method is for fabricating a capacitor [column 11, lines 5-10], and further describes the process in detail in example 14 to include all the limitations of the claimed invention as described above.

Regarding claims 5 and 9, applicant alleges that Senzaki *et al.* fails to disclose a zirconium complex and a platinum complex specifically to form a platinum-zirconium film from the precursor components. It is noted that a reference that clearly names the claimed species anticipates the claim no matter how many other species are named (*Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990)). In this instance, Senzaki *et al.* discloses the selection of two metal-ligand complex precursors and then specifically lists both zirconium and platinum [column 4, lines 20-32]. Applicant's arguments directed at Kirlin *et al.* are moot since Senzaki *et al.* is not missing any of the claimed limitations as alleged by the applicant.

Regarding claims 6 and 10, applicant alleges that Senzaki *et al.* fails to disclose a zirconium complex and a platinum complex specifically to form a platinum-zirconium film from the precursor components. It is noted that a reference that clearly names the claimed species anticipates the claim no matter how many other species are named (*Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990)). In this instance, Senzaki *et al.* discloses the selection of two metal-ligand complex precursors and then specifically lists both zirconium and platinum [column 4, lines 20-32]. Applicant's arguments directed at Desu *et al.* are moot since Senzaki *et al.* is not missing any of the claimed limitations as alleged by the applicant. Further, applicant's allegations that there is no motivation to combine the teachings of Desu *et al.* with Senzaki *et al.* are not persuasive since the difficulties described with relation to $Zr(acac)_4$ involve oxide growth and not the metal layer growth of Senzaki *et al.*

Regarding claims 26, 27, and 31, applicant alleges that Toyoda *et al.* fails to disclose the limitations of fabricating a capacitor. Toyoda *et al.* explicitly states that the disclosed method is for fabricating a capacitor [column 11, lines 5-10], and further describes the process in detail in example 14 to include all the limitations of the claimed invention as described above.

Applicant's arguments directed at Miedema *et al.* are moot since Toyoda *et al.* is not missing any of the claimed limitations as alleged by the applicant.

Regarding claims 28 and 29, applicant alleges that Toyoda *et al.* fails to disclose the limitations of fabricating a capacitor. Toyoda *et al.* explicitly states that the disclosed method is for fabricating a capacitor [column 11, lines 5-10], and further describes the process in detail in example 14 to include all the limitations of the claimed invention as described above. Applicant's arguments directed at Kirlin *et al.* are moot since Toyoda *et al.* is not missing any of the claimed limitations as alleged by the applicant. Further, in response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

Regarding claim 30, applicant alleges that Toyoda *et al.* fails to disclose the limitations of fabricating a capacitor. Toyoda *et al.* explicitly states that the disclosed method is for fabricating a capacitor [column 11, lines 5-10], and further describes the process in detail in example 14 to include all the limitations of the claimed invention as described above. Applicant's arguments directed at Desu *et al.* are moot since Toyoda *et al.* is not missing any of the claimed limitations as alleged by the applicant. Further, in response to applicant's argument that the examiner has combined an excessive number of references, reliance on a large number of references in a rejection does not, without more, weigh against the obviousness of the claimed invention. See *In re Gorman*, 933 F.2d 982, 18 USPQ2d 1885 (Fed. Cir. 1991).

Regarding claims 32 – 37, applicant alleges that Senzaki *et al.* fails to disclose a zirconium complex and a platinum complex specifically to form a platinum-zirconium film from the precursor components. It is noted that a reference that clearly names the claimed species anticipates the claim no matter how many other species are named (*Ex parte A*, 17 USPQ2d 1716 (Bd. Pat. App. & Inter. 1990)). In this instance, Senzaki *et al.* discloses the selection of two metal-ligand complex precursors and then specifically lists both zirconium and platinum [column 4, lines 20-32]. Applicant's arguments directed at Lee *et al.* and Tani *et al.* are moot since Senzaki *et al.* is not missing any of the claimed limitations as alleged by the applicant.

Conclusion

16. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

17. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christian Wilson whose telephone number is (571) 272-1886. The examiner can normally be reached on weekdays, 7:30 AM to 4 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Elms can be reached on (571) 272-1869. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

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PRIMARY EXAMINER